Vascular

Version 5.2

Corrected, Updated, Lighter

PLAB 1 Keys is for PLAB-1 and UKMLA-AKT (Based on the New MLA Content-Map)

With the Most Recent Recalls and the UK Guidelines

ATTENTION: This file will be updated online on our website frequently!

(example: Version 2.7 is more recent than Version 2.6, and so on)

Key 1	(6P features of Acute Limb Ischemia) → Pain (Sudden), Pallor, Pulselessness, Paralysis, Paraesthesia (Numbness), Perishing cold. ◙ Acute limb ischemia is a **surgical emergency** that requires urgent revascularisation (Angioplasty or Open surgery) in 4-8 hours to save a limb. Thus, it needs to be referred urgently to a vascular surgeon.

	◙ In the presence of **acute limb ischemia** + **Irregular pulse** (likely due to **Arterial Fibrillation**), the likely cause of this limb ischemia is → **Embolus**.
Key 2	Painless, **Pulsatile** mass (swelling) → **Aneurysm** e.g. painless pulsatile mass near the groin → Femoral artery aneurysm.
Key 3	**Renal cell carcinoma** can cause → **Varicocele** "Bluish, bag of worms sensation, dragging pain or painless scrotal swelling" → Reassure or do surgery if severe persistent pain or infertility **Renal Cell Carcinoma** can also cause → **Inferior Vena Cava Syndrome** "**Occlusion of IVC** → pitting, non-tender **edema of the lower limbs** + dilated veins on the lower abdomen".
Key 4	**Buerger's disease [Thromboangiitis Obliterans]**

◙ A small and medium vessel vasculitis.

◙ Strongly associated with **smoking** – especially in **Young men** 25-45 YO.

◙ Features

√ **Extremity ischaemia**: intermittent claudication, rest pain, ischaemic ulcers.

√ Superficial thrombophlebitis

√ Raynaud's phenomenon

◙ **STOP SMOKING**

Example,

A 29 YO male was admitted for severe right calf pain. This pain has been increasing over the las 3 months. He is smoker but with no Hx of HTN or DM. O/E → loss of dorsalis pedis and posterior tibial pulsation + Non-healing ulcer over the right first metatarsophalangeal joint.

The likely Dx → **Thromboangiitis Obliterans (Buerger's Disease)**.

Do not get confused:

◘ Buerger's → Vascular → **Thromboangiitis Obliterans**

	"Typically, a young man with a strong Hx of **smoking** presenting with chronic limb ischemia e.g. **no pulse**, ischemic non healing **ulcer**, **claudication** and rest leg pain". ▫ Berger's → **IgA Nephropathy** "Typically, a young adult with **haematuria 1-2 days** after an URTI".
Key 5	A 66 YO smoker and hypertensive patient presents with a sudden onset weakness of the right arm with dysphasia that resolved within 24 hours. ♦ The likely Dx → **Transient Ischemic Attack (TIA)**. **(Resolved within 24 hours)** ♦ The best **next** modality → **Carotid Doppler Scanning** Carotid duplex should be done within 2 weeks of admission to check for **carotid artery stenosis** to assess for the need of carotid endarterectomy. **When to perform Carotid endarterectomy?** √ If internal carotid artery **stenosis** is **≥ 50%** in ♂ (**Men**) √ If internal carotid artery **stenosis** is **≥ 70%** in ♀ (**Women**)

An elderly with recurrent episodes of TIAs and Loss of Conscious.

The likely reason → **Carotid artery stenosis**.

√ **Usually**,

♦ AF is an underlying cause of Strokes.

♦ Carotid stenosis is an underlying cause of TIAs with LOC.

Key 6

Thoracic outlet syndrome (TOS)

• It is a condition in which there is **compression** of the nerves, arteries, or veins in the passageway from the lower neck to the armpit.

• There are three main types: neurogenic, venous, and arterial.

• The neurogenic type is the most common and presents with pain, weakness, and occasionally loss of muscle at the base of the thumb.

• The venous type results in swelling, pain, and possibly a bluish coloration of the arm. The arterial type results in pain, coldness, and paleness of the arm.

• Sometimes, a pulsatile subclavian aneurysm might be seen.

Example,

	A 42 YO man has pain below the right clavicle with a pulsatile mass just below the right clavicle. He has a shooting pain and reduced sensation down the right arm. His right hand is a bit cold and shows discoloration. The likely Dx → **Thoracic outlet syndrome**.
Key 7	**Aortic dissection** • Aortic dissection is a rare but serious cause of chest pain (radiates to back). • **Pathophysiology** Tear in the tunica intima of the wall of the aorta. • **Associations** **√ Hypertension**: the **most important risk factor** √ Trauma: e.g., after a road traffic accident. √ Bicuspid aortic valve √ collagens: Marfan's syndrome, Ehlers-Danlos syndrome Turner's and Noonan's syndrome √ pregnancy √ syphilis

• **Features**:

√ Chest pain: typically, sudden severe, radiates through to the back/ shoulders (eg, interscapular pain) and 'tearing' in nature.

√ Other Features: Tachycardia, Tachypnea, Hypotension.

√ X-ray may show → Widening of the mediastinum. Imp √.

√ aortic regurgitation.

√ Sometimes: a **big difference of blood pressure between right and left arms**.

√ Hx of hypertension or trauma (as risk factors).

Note that **hypertension** is a risk factor, while **hypotension** is a presenting sign.

Other features may result from the involvement of specific arteries.

For example, coronary arteries → angina,

spinal arteries → paraplegia,

distal aorta → limb ischaemia.

• **Investigations**:

√ If hemodynamically stable → **CT angiography** (definitive).

√ If unstable (eg, SBP < 90) → Trans-oesophageal echocardiogram (in theatre).

the majority of patients have no or non-specific ECG changes. In a minority of patients, ST segment elevation may be seen in the inferior leads

- **Classification**

√ **Stanford classification**

type A – ascending aorta, 2/3 of cases

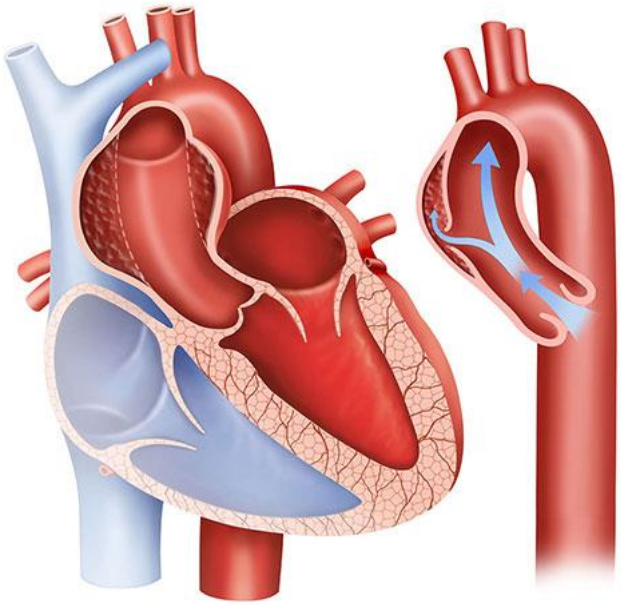
type B – descending aorta, distal to left subclavian origin, 1/3 of cases

√ **DeBakey classification**

type I – originates in ascending aorta, propagates to at least the aortic arch and possibly beyond it distally

type II – originates in and is confined to the ascending aorta

type III – originates in descending aorta, rarely extends proximally but will extend distally



Example 1,

A 77-year-old woman presents to the ER with:

Severe interscapular pain that started around 10 hours ago. The pain was sudden and quick in onset. She has difficulty in breathing. Vital signs show: normal temperature, tachycardia (102 bpm), hypotension (90/60 mmHg0), Tachypnea (26 breaths/minute). normal O2 saturation (98%). ECG shows normal sinus tachycardia.

- The most likely Dx → **Aortic dissection**.
- The most appropriate investigation → **CT angiography** (definitive).
- If this patient was hemodynamically unstable (eg, cardiac ischemia, systolic blood pressure < 90) → Trans-oesophageal echocardiogram.

√ Note: in aortic dissection, around 30% of patient would have normal ECG features. The rest may have features of ischemia.

Example 2,

Acute Severe central chest pain increasing in intensity

+

Sweating, SOB.

+

Tachycardia and hypotension

+

Chest X-ray → Wide mediastinum

→ **Aortic Dissection**

Example 3,

Acute Severe crushing chest pain radiates to shoulders and back.

+

Sweating, SOB.

+

Tachycardia and hypotension

+

Long, slender limbs and fingers

→ **Thoracis Aortic Dissection**

(Long, slender limbs and fingers → **Marfan's** – a common association)

Example 4,

Sudden severe substernal pain.

+

Hx of HTN and DM

+

Tachycardia and hypotension

+

Not responding to nitrates

→ **Thoracis Aortic Dissection**

Example 5,

Acute Severe chest pain radiates to both shoulders. Hx of **HTN**

+

SOB

+

Cold peripheries and paraplegia

→ **Thoracis Aortic Dissection**

Example 6,

Road traffic accident

+

Acute chest and back pain

+

Sweating, tachypnea.

+

Tachycardia

+

Difference between BP in both arms.

	+ What would chest X-ray reveal mostly in this case? → **Wide mediastinum**
Key 8	**Axillary Lymph nodes clearance** (removal) during **radical mastectomy** can lead to → **Upper Limb Lymphoedema** (Redness and Swelling) ± Frozen shoulder. Rx → Physiotherapy and arm exercise.
Key 9	**Claudication pain in Peripheral Arterial Disease** **The level of ischemia**: ♦ **Aorto-iliac artery occlusion**: Pain in buttocks, thighs ± Erectile Dysfunction (Leriche Syndrome) ♦ **Common iliac artery occlusion**: → pain extends to just above inguinal ligament. ♦ **Femoral artery occlusion**:

	→ pain in leg (below inguinal ligament). Femoral pulse is felt but the pulses below it are not felt. ♦ **Femoro-politeal** → Pain is below knee.
Key 10	**Peripheral arterial disease (PAD)**: • intermittent claudication (leg pain even on rest may occur later in severe cases) • critical limb ischaemia: 6 Ps • Non-heling ulcers, gangrene. • acute limb-threatening ischaemia **Intermittent claudication** **Features** • intermittent claudication: aching or burning in the leg muscles following walking. • patients can typically walk for a predictable distance before the symptoms start • usually relieved within minutes of stopping • not present at rest (unless if late and severe PAD) **Assessment**

- check the femoral, popliteal, posterior tibialis and dorsalis pedis pulses
- check **ankle brachial pressure index** (**ABPI**)
- **duplex ultrasound is the first line investigation**
- magnetic resonance angiography (MRA) should be performed prior to any intervention

Interpretation of ABPI "for general knowledge"

Result	Usual clinical correlation
1	Normal
0.6-0.9	Claudication (see above)
0.3-0.6	Pain even at rest
<0.3	Impending

Peripheral arterial disease (PAD) is strongly linked to **smoking**. Patients who still smoke should be given help to quit smoking.

Comorbidities should be treated, including

hypertension

diabetes mellitus

obesity

Steps to be taken:

	√ Quit Smoking. √ Treat and control HTN, DM, Obesity, High cholesterol. √ Exercise.
Key 11	**Severe PAD or critical limb ischaemia may be treated by:** **Angioplasty ▌stenting ▌bypass surgery** **Important!** ◙ Any patient who has established cardiovascular disease (including peripheral arterial disease), all patients should be taking a **statin** regardless of their cholesterol level. Atorvastatin 80 mg is currently recommended.
Key 12	**Ruptured Abdominal Aortic Aneurysm (AAA)** ◙ **The classic picture**: a triad of: Pain, Hypotension, pulsatile tender abdominal mass. - **Sudden onset** of severe abdominal +/- Lower back +/- Flank pain. - **Shock** (Hypotension, Sweating, Fainting) - **Absent Lower Limb Pulse, mottled skin.**

	As he is severely hypotensive (internally bleeding), the **initial step** is: → **IV normal saline to bring Systolic BP up to 90**. ◙ It is a **surgical emergency**; therefore, immediate **Ultrasound** is the most appropriate **initial investigation**. ◙ If no U/S in the options, go for **CT scan** abdomen.
Key 13	**IMPORTANT**: **√** Deterioration of Renal function tests after initiation of ACE inhibitor in a hypertensive patient → **Bilateral Renal Artery Stenosis**. So, ACEIs are contraindicated in bilateral renal artery stenosis. **√ Bilateral Small Kidneys + Hypertension** → **Bilateral renal artery stenosis**
Key 14	**Coarctation of Aorta** ◙ Coarctation of the aorta describes a **congenital narrowing of the descending aorta**. ◙ More common in **males** (despite association with Turner's syndrome)

	◙ **Features** √ infancy: heart failure √ adult: hypertension **√ Radio-femoral delay √** **√ mid systolic murmur**, maximal over back **√ Nosebleeds**, **headaches**, **LL pain on exertion** √ apical click from the aortic valve ◙ **Important Associations** Turner's syndrome ▌Berry aneurysms ▌Neurofibromatosis
Key 15	(Important): **The major Cause "aetiology" for**: ◙ **Aortic Aneurysm** → **Atheroma** "**Atherosclerosis**" ◙ **Aortic Dissection** → **HTN**.
Key 16	**Important Vascular Differentials** ♦ **Acutely p**ainful, **p**ale, **p**aralysed and **p**ulseless in a smoker with AF → **Acute Limb Ischemia** ♦ **Calf pain**, **relieved by rest** = **Claudication**", with calf non-healing ulcer,

	+ cold, pulseless peripheries ± Hx of DM, HTN. → **Peripheral Arterial disease (PAD)** ♦ Around **40 YO** (25-45 YO) **male**, Hx of **smoking**, Calves pain relieved by rest (**Claudication**), reduced distal pulses. → **Thromboangiitis Obliterans (Buerger's Disease)**.
Key 17	**Central chest pain radiating to the back** Suspect → **Aortic Dissection**
Key 18	A man underwent surgery for hip fracture and is likely to be immobile for the next days. His past medical history is unremarkable. What should be given to reduce the risk of venous thromboembolism? → Prophylactic dose of low molecular weight heparin (LMWH). Examples of LMWH → Fondaparinux ▌Enoxaparin
Key 19	◙ Long-term medications after TIA → **clopidogrel and statin**

Key 20

◙ A 66 YO smoker and hypertensive patient presents with a sudden onset weakness of the right arm with dysphasia that resolved within 24 hours.

♦ The likely Dx → **Transient Ischemic Attack (TIA)**. **(Resolved within 24 hours)**

♦ The best **next** modality → **Carotid Doppler Scanning**

Carotid duplex should be done within 2 weeks of admission to check for **carotid artery stenosis** to assess for the need of carotid endarterectomy.

When to perform Carotid endarterectomy?

√ If internal carotid artery **stenosis** is **≥ 50%** in ♂ (**Men**)

√ If internal carotid artery **stenosis** is **≥ 70%** in ♀ (**Women**)

◙ An elderly with recurrent episodes of TIAs and Loss of Conscious.

The likely reason → **Carotid artery stenosis**.

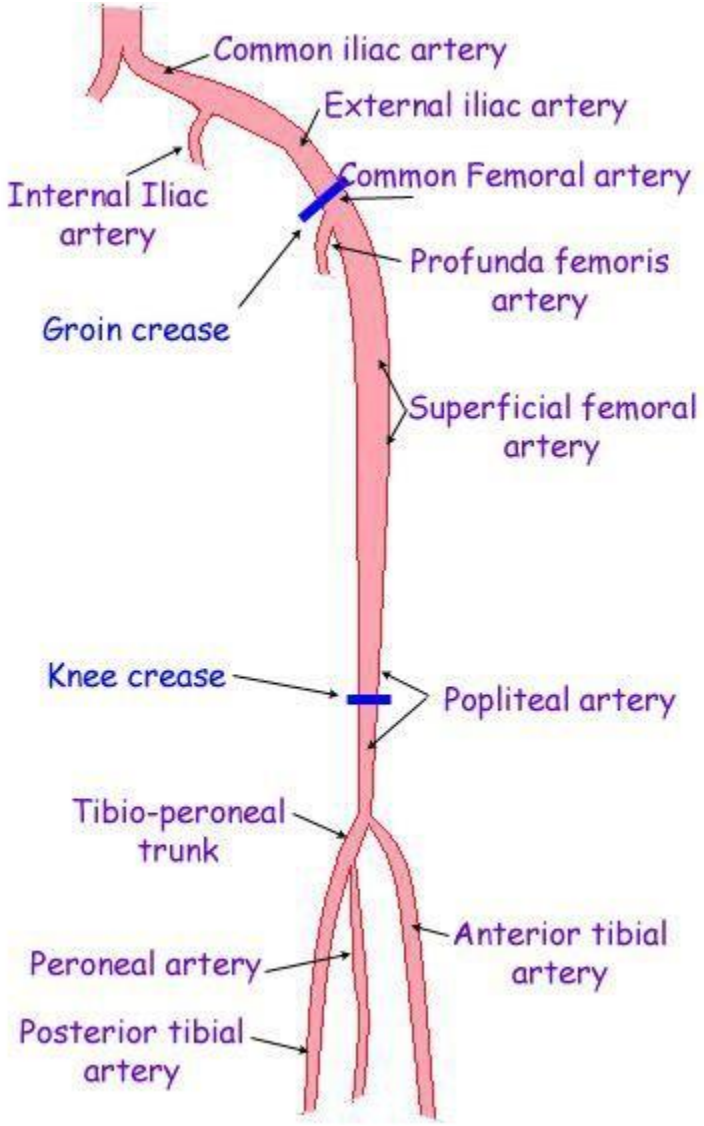
√ **Usually**,

♦ AF is an underlying cause of Strokes.

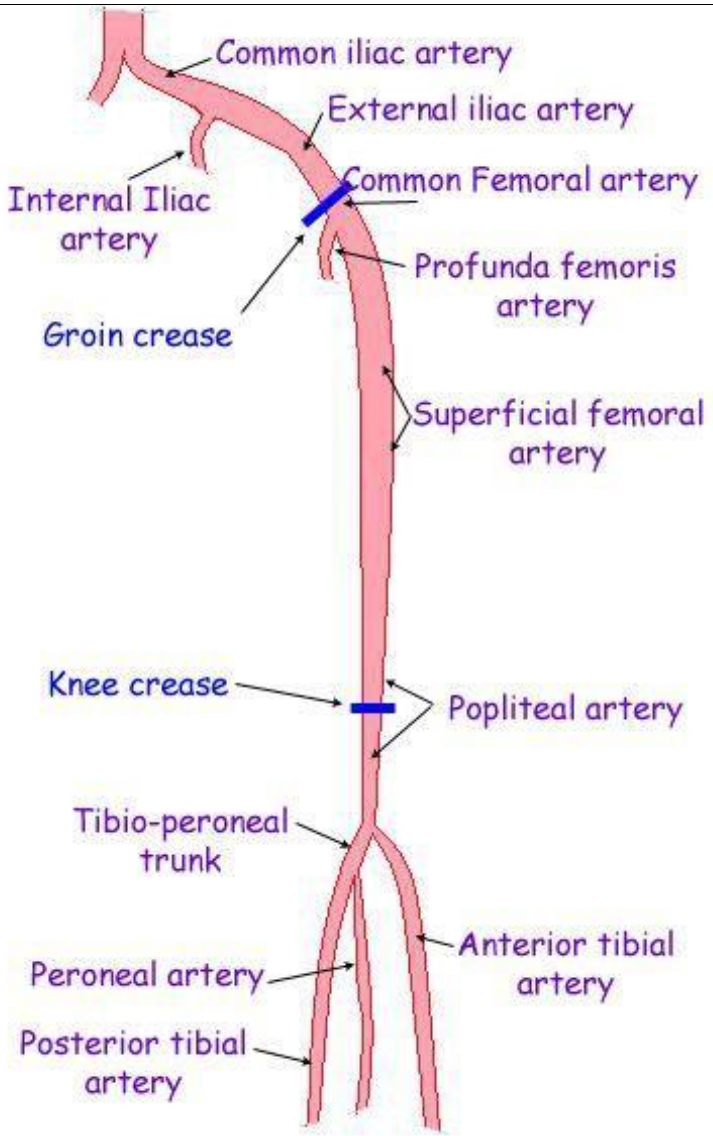
♦ Carotid stenosis is an underlying cause of TIAs with LOC.

Key 21	◙ A man with TIA was found to have stenosis 65% on carotid doppler scan. → **Consider Carotid endarterectomy**.
Key 22	◙ **A 7 YO man had 2 episodes of slurred speech and painless loss of vision of the left eye for 20 minutes after which he recovered completely. Carotid duplex US showed left side internal carotid stenosis of 80%.** → **Endarterectomy**. √ Amaurosis Fugax and slurred speech recovered in < 24 hours → TIAs. √ Carotid endarterectomy is of choice especially if the stenosis of ≥ 50% in men and ≥ 70 in women. √ Endovascular angioplasty with stenting has higher mortality rates. So, should be avoided unless the patient cannot tolerate surgery.
Key 23	**A 52yr old woman with disseminated Renal carcinoma, presented with dilated abdominal veins and pitting oedema of the right leg up to the groin. What's the cause of the leg swelling?**

	A. Hypoalbuminaemia B. **IVC obstruction** C. Lymphatic infiltration D. Portal vein occlusion **Renal Cell Carcinoma** can cause → **Inferior Vena Cava Syndrome** "**Occlusion of IVC** → pitting, non-tender edema of the lower limbs + dilated veins on the lower abdomen". **Renal cell carcinoma** can also cause → **Varicocele** "Bluish, bag of worms sensation, dragging pain or painless scrotal swelling" → Reassure or do surgery if severe persistent pain or infertility
Key 24	**A question about not feeling femoral and popliteal pulses. Where's the occlusion?** A. **External iliac artery** B. Femoropopliteal artery C. Aortoiliac artery D. Popliteal artery

	The femoral artery is not felt → the obstruction is at the level above it (Proximal to it), which is External iliac artery. 
Key 25	**Patient developed unilateral limb swelling 6 days post CS after prolonged obstructed labour. Left Feet is cold, mottled up to the inguinal crease. Where is the occlusion?** A. **Femoral artery thrombus**

	B. Femoral vein atheroma C. Iliac artery thrombus D. common iliac vein E. Post phlebitis syndrome Since the limb is **cold** and **mottled**, it is an **arterial** issue. The level just below the inguinal crease → Femoral artery.



Key 26

A 58 YO man had road traffic accident and presents with a fracture of his right mid-shaft femur. His right dorsalis pedis, posterior tibial and popliteal pulses cannot be felt. What is the most likely damaged artery?

A. **Superficial femoral artery**

B. Deep femoral artery

C. Popliteal artery

D. External iliac artery

The obstruction here at the level above (Proximal to) the popliteal artery, which is superficial femoral artery.

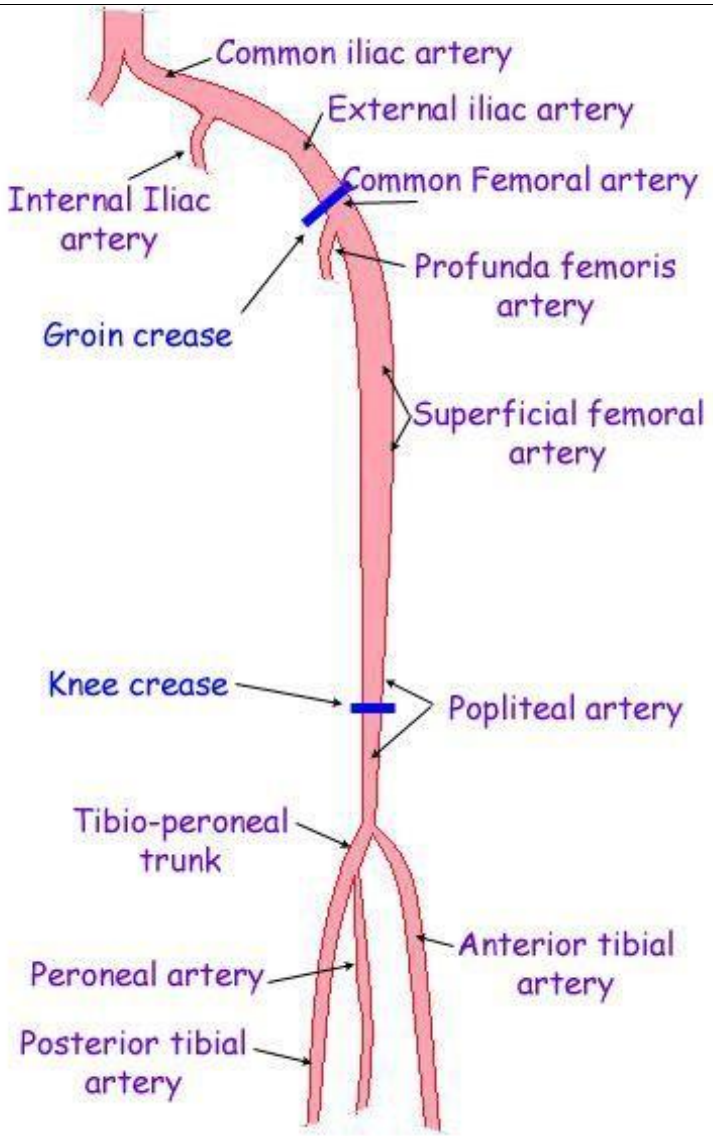
Note that deep femoral artery damage does not result in the loss of foot pulse.

√ See the picture below, you will notice that the continuation of arteries is as follows:

Common iliac artery → **External iliac artery** → **Common femoral artery** → **Superficial femoral artery** → **Popliteal artery** → **Posterior tibial artery**

Always point the most proximal artery that has its pulse lost and jump one level proximal to it "above it" to locate the damaged artery.

"in the picture below, profunda femoris is another name for deep femoral artery".



Key 27

Deep Vein Thrombosis (DVT) Diagnosis and Management

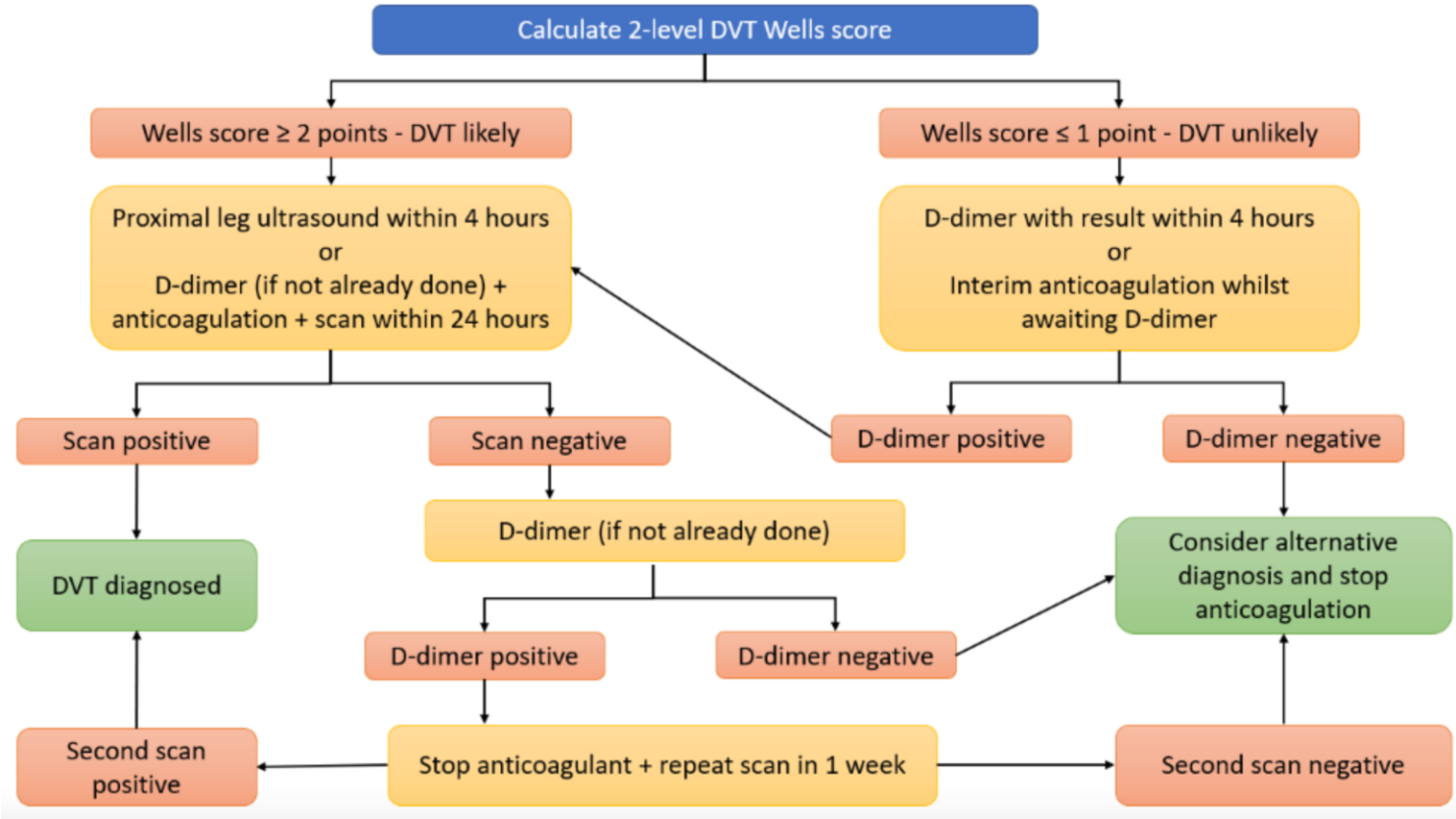
◙ **Diagnosis:**

2-level DVT Wells test

Criteria	Points
Active cancer (treatment ongoing, within 6 months, or palliative)	1
Paralysis, paresis or recent plaster immobilisation of the lower extremities	1
Recently bedridden for 3 days or more or major surgery within 12 weeks requiring general or regional anaesthesia	1
Localised tenderness along the distribution of the deep venous system	1
Entire leg swollen	1
Calf swelling at least 3 cm larger than asymptomatic side	1
Pitting oedema confined to the symptomatic leg	1
Collateral superficial veins (non-varicose)	1
Previously documented DVT	1
An alternative diagnosis is at least as likely as DVT	-2

Score ≥ 2 points → DVT likely

Score ≤ 1 point → DVT unlikely



◙ Updates on Management of DVT:

◙ The cornerstone of VTE management is anticoagulant therapy. This was historically done with warfarin, often preceded by heparin until the INR was stable. However, the development of DOACs, and an evidence base supporting their efficacy, has changed modern management.

◘ Choice of anticoagulant:

- the big change in the 2020 guidelines was the increased use of **DOACs**

apixaban or rivaroxaban (both DOACs) should be offered first-line following the diagnosis of a DVT.

• instead of using low-molecular weight heparin (LMWH) until the diagnosis is confirmed, NICE now advocate using a DOAC once a diagnosis is suspected, with this continued if the diagnosis is confirmed

• if neither apixaban or rivaroxaban are suitable then either LMWH followed by dabigatran or 31doxaban OR LMWH followed by a vitamin K antagonist (VKA, i.e. warfarin).

• if the patient has active cancer: previously LMWH was recommended, however; the new guidelines now recommend using a DOAC, unless this is contraindicated.

• if renal impairment is severe (e.g., < 15/min) then LMWH, unfractionated heparin or LMWH followed by a VKA "warfarin".

• if the patient has antiphospholipid syndrome (specifically 'triple positive' in the guidance) then LMWH followed by a VKA (warfarin) should be used.

• Important:

In people with DVT where anticoagulation therapy is CONTRAINDICATED like those with **recent hemorrhagic stroke** can be managed using **surgical thrombectomy**.

◘ Length of anticoagulation

all patients should have anticoagulation for at least 3 months. (3-6 months).

	◘ *Important:* **A tricky question was recently asked about a woman with hemorrhagic stroke 3 days ago who has been admitted and while in-hospital, she developed DVT.** → Anticoagulation including Warfarin, LMWH and DOACs are all contraindicated in such a recent hemorrhagic event. The treatment option therefore is → **Percutaneous mechanical thrombectomy**. "A procedure involving local anaesthesia and imaging to insert a catheter through the vein that contains the thrombus to aspirate it. During this procedure, **inferior vena cava filter** can be used to prevent pulmonary embolism that might develop from a dislodged thrombus".
Key 28	**Venous Ulcer VS Arterial VS Neuropathic ulcer** **[1]** ◙ **Ulcer at medial distal leg (e.g., medial malleolus), Haemosiderin deposits, granulation tissue, can be painful because there is no loss of sensation.** → Venous ulcer. "once on medial malleolus, painful and there is hemosiderin deposit, pick venous ulcer even if the patient is diabetic". **√ Other features** → Shallow, normal capillary refill time.

√ Causes → varicose veins, DVT, Pregnancy, ↑ weight.

√ Rx → Compression stockings, dressing, leg elevation, encourage mild exercise.

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[2]

◙ Ulcer on toes, feet, lateral malleolus or tibia that is irregular, deep and necrotic + unilateral absent or weak pulses on the affected side + Very painful + prolonged capillary refill time.

→ Arterial "ischemic" ulcer.

√ Causes → peripheral arterial disease (RFs: smoking, HTN, DM).

√ Rx → perform ABPI "Ankle–brachial pressure index" – Manage the peripheral arterial disease "e.g., antiplatelets, statins" – consider surgical revascularization.

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[3]

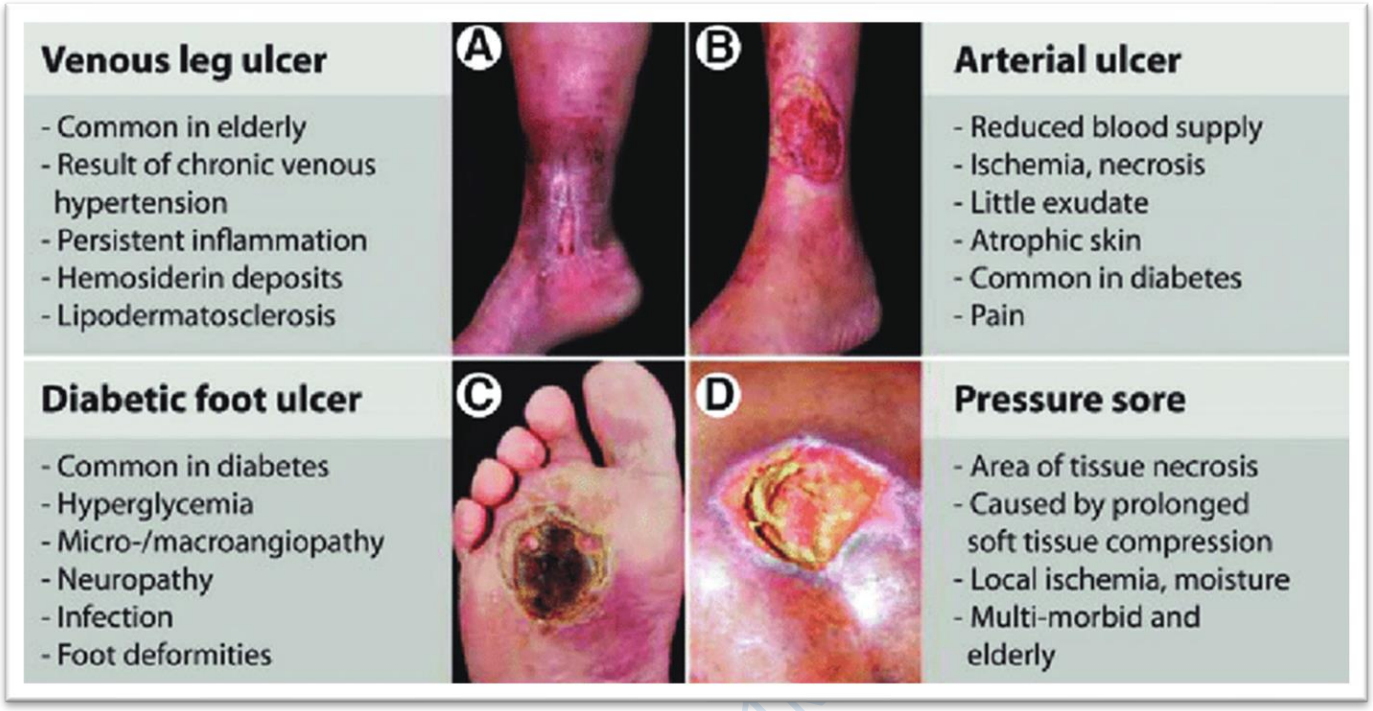
◙ Ulcer on the toes or plantar surface of the foot "the sole" + Deep and punched out + surrounded by callous + reduced sensation

→ Neuropathic "diabetic" ulcer.

√ Causes → DM, pressure points on the bottom of the feet.

√ Rx → Remove pressure, manage DM, diabetic foot care.

Venous ulcer: note the hemosiderin deposits around the ulcer. Note the location at the medial malleolus.



Example:

A 75 YO man with DM type 2 presents with ulcer. It is located above the right medial malleolus. There are hemosiderin deposits around the ulcer. There is mild pain on palpating the ulcer. Dorsalis pedis pulses are weak on both feet.

The likely Dx → **Venous ulcer**

"medial malleolus + hemosiderin + mild pain -still sensation-".

Note that the weak pulses are bilaterally and not only on the affected side. Thus, not likely arterial ulcer.

Key 29	A 60 YO man presents with cramp-like pain in his calves when walking and is relieved within 5 minutes of rest. He is hypertensive and is on antihypertensive medications. He does not have limb weakness or numbness. There are weak distal pulses. The likely Dx → Peripheral artery disease. (Intermittent claudication). The NEXT step → **Ankle brachial pressure index (ABPI)** This is done even before **duplex U/S** of the lower limbs.
Key 30	**A 60-year-old smoker man presents with pain in his left hand. The pain started acutely 2 days ago. On examination, there swelling, discoloration, coldness and pain in his left hand and fingers. The left radial pulse is absent. An image is shown below:**  **What is the most likely diagnosis?**

	→ **Acute limb ischemia**. (**6P features of Acute Limb Ischemia**) → **P**ain (Sudden), **P**allor, **P**ulselessness, **P**aralysis, **P**araesthesia (Numbness), **P**erishing cold. ◙ Acute limb ischemia is a **surgical emergency** that requires urgent revascularisation (Angioplasty or Open surgery) in 4-8 hours to save a limb. Thus, it needs to be referred urgently to a vascular surgeon. ◙ In the presence of **acute limb ischemia** + **Irregular pulse** (likely due to **Arterial Fibrillation**), the likely cause of this limb ischemia is → **Embolus**.
Key 31	**Thoracic Outlet Syndrome (TOS) Key Points to Remember** √ Unilateral. √ Presents gradually. √ Weakness and atrophy may be seen in the thenar muscles (innervated by the median nerve) particularly abductor pollicis brevis.

	√ It can involve the muscles that are innervated by the ulnar nerve "eg, in the forearm". √ Pain and or numbness in the hand or forearm, commonly affecting the ulnar side. √ Sometimes: pulsatile mass below clavicle or in the supraclavicular area. **Also**: depending on which neurovascular structures are involved, it may be seen together with a weak radial pulse, forearm cyanosis (bluish), and or thenar muscle weakness. (may or may not).
Key 32	**Quick Note:** The presence of renal mass (eg, renal cell carcinoma) can exert pressure on inferior vena cava (IVC) leading to inferior vena cava syndrome that can present with bilateral lower limb edema and congestion (gradually developing). • **Important associations of renal cell carcinoma:** √ Inferior vena cava syndrome. √ Varicocele.
Key 33	**Management of Swollen Limb in a Haemodialysis Patient with a PICC Line** **Patient Profile:** • 59-year-old woman with chronic renal failure on haemodialysis.

- Four-day history of swelling in her right upper limb.
- Limb is warm but not red, and no systemic symptoms.
- PICC (Peripherally Inserted Central Catheter) line placed three weeks ago for TPN (Total Parenteral Nutrition).

◙ **Most Appropriate <u>Initial Step</u>:** → Remove the PICC and elevate the limb.

◙ **Possible Diagnoses:**

• **Catheter-related venous thrombosis:**

- Requires follow-up with an ultrasound.
- Removing the PICC reduces further vascular injury.
- Elevating the limb helps blood return to the heart, reducing swelling and pain.

• **Extravasation:**

- Leakage of infused fluid into surrounding tissue.
- Can occur if the PICC is not properly secured or if there is a rupture in the vein wall.
- Removal of the catheter prevents further damage.

• **Note: Catheter-related Infection is** Unlikely in this case due to the absence of fever and redness.

	• **Notes**: √ Immediate removal of the PICC line and elevation of the limb are essential first steps to address potential complications such as thrombophlebitis or catheter-related thrombosis. √ Informing a vascular surgeon is important but should follow the immediate actions of removing the catheter and managing the swelling (It comes next).